

Opioids and Pregnancy: Lifecourse Perspectives

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Disclosures

- None

Overview

- Review the history of women and substance use with particular attention to the current opioid epidemic
- Discuss what happens when pregnant women who use drugs get pregnant
- Review the risks associated with substance use and pregnancy and newborn outcomes
- Review standards of care for labor and delivery management of women with substance use disorder
- Explain substance-exposed newborn reporting requirements and process in the state of Maryland





LAUDANUM

EACH FLUID OUNCE CONTAINS

UPPER CASE | SMALL CAPS AND SPECIALS

40% ALCOHOL

47 GRAINS OPIUM

TINCTURE

BY LATTI & SONS
PRODUCE

LAUDANUM.--Poison

EACH FLUID OUNCE CONTAINS 12-20-8
45 1/2 GRAINS OPIUM and 40 % ALCOHOL

U.S.P. TINCT OPI.

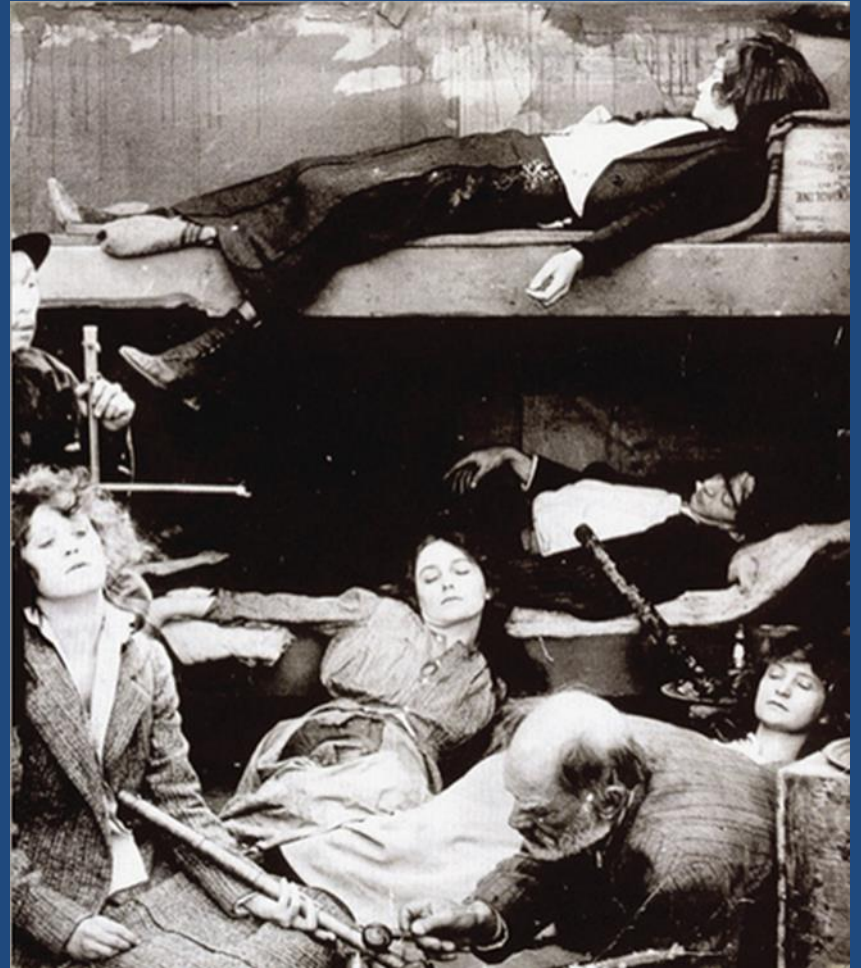
3 mo. old, 1 drop	10 yrs. old, 10 drops
1 yr. old, 5 drops	20 yrs. old, 20 drops
4 yrs. old, 5 drops	Adult, 25 drops

McORMICK & CO., Baltimore, Md., U.S.A.

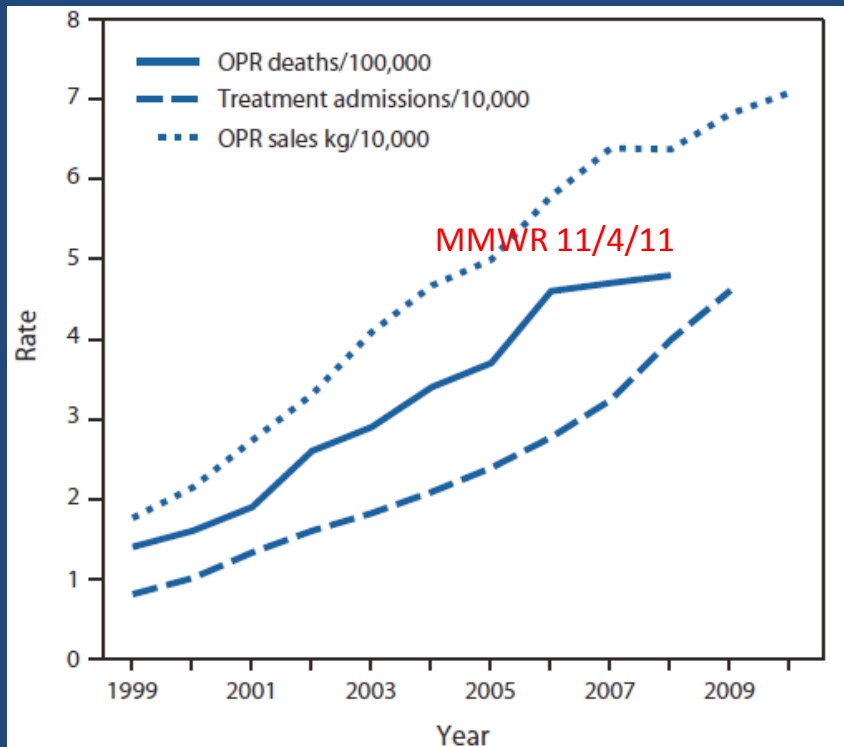




Eugene Grasset, La Morphinomane, 1897 color lithograph



The current opioid epidemic



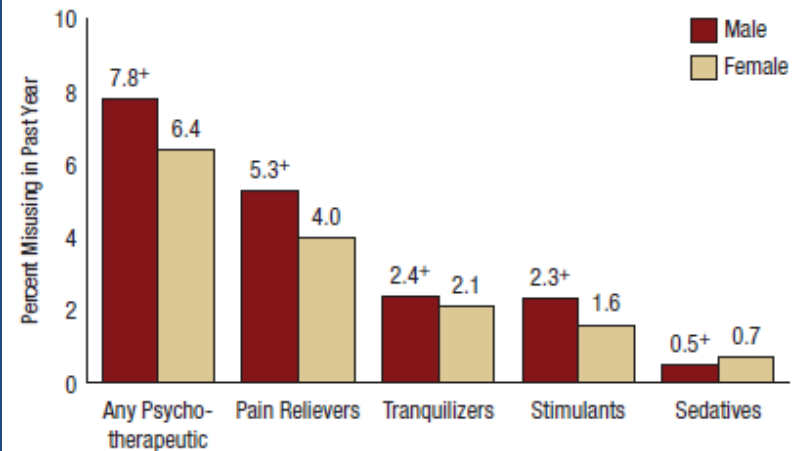
- Iatrogenic
 - 2012 259,000,000 opioid prescriptions for pain
 - Enough for every adult in US to have month supply
- Women in the epidemic
 - Overdose death (2004-2010) increased:
 - 237% for men
 - 400% for women

Prescription Drug Use and Misuse

Past Year	Male	Female
Prescription psychotherapeutic drugs	40.9%	47.8%
“Pain Relievers”	33.9%	38.8%
Tranquilizers	11.3%	17.9%
Sedatives	5.6%	8.2%
Stimulants	6.5%	6.3%

NSDUH 2015

Figure 8. Past Year Misuse of Prescription Psychotherapeutics among People Aged 12 or Older, by Drug Type and Gender: Percentages, 2015



⁺ Difference between this estimate and the estimate for females is statistically significant at the .05 level.

Initiation of Opioid Misuse

- Past Year Initiates 2015 (NSDUH)
- 2.1 million = 5800 initiates/day
 - 0.9 million males (0.7%)
 - 1.2 million females (0.9%)

Patterns of Opioid Utilization in Pregnancy in a Large Cohort of Commercial Insurance Beneficiaries in the United States

Brian T. Bateman, M.D., M.Sc., Sonia Hernandez-Diaz, M.D., Dr.P.H., James P. Rathmell, M.D., John D. Seeger, Pharm.D., Dr.P.H., Michael Doherty, M.S., Michael A. Fischer, M.D., M.S., Krista F. Huybrechts, M.S., Ph.D.

Anesthesiology, V 120 • No 5

May 2014

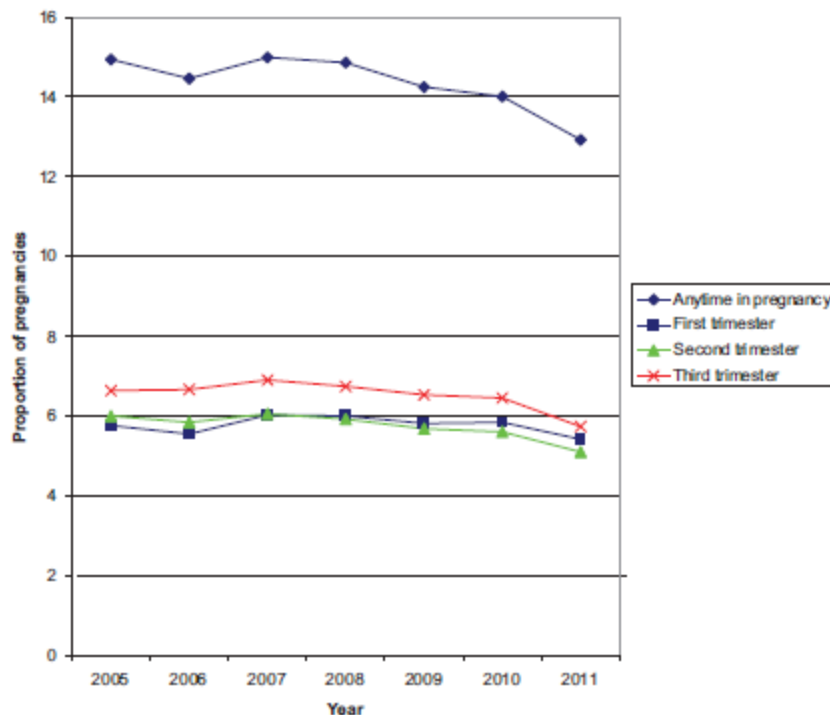


Fig. 2. Temporal trends in opioid dispensing during pregnancy (overall) and by trimester.

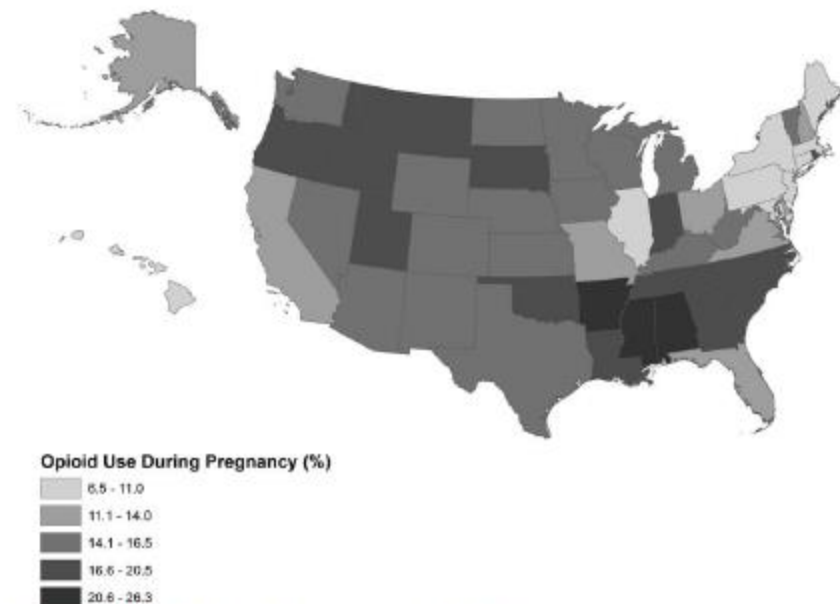


Fig. 4. Prevalence of opioid dispensing during pregnancy (overall) by state.



Recent trends in treatment admissions for prescription opioid abuse during pregnancy

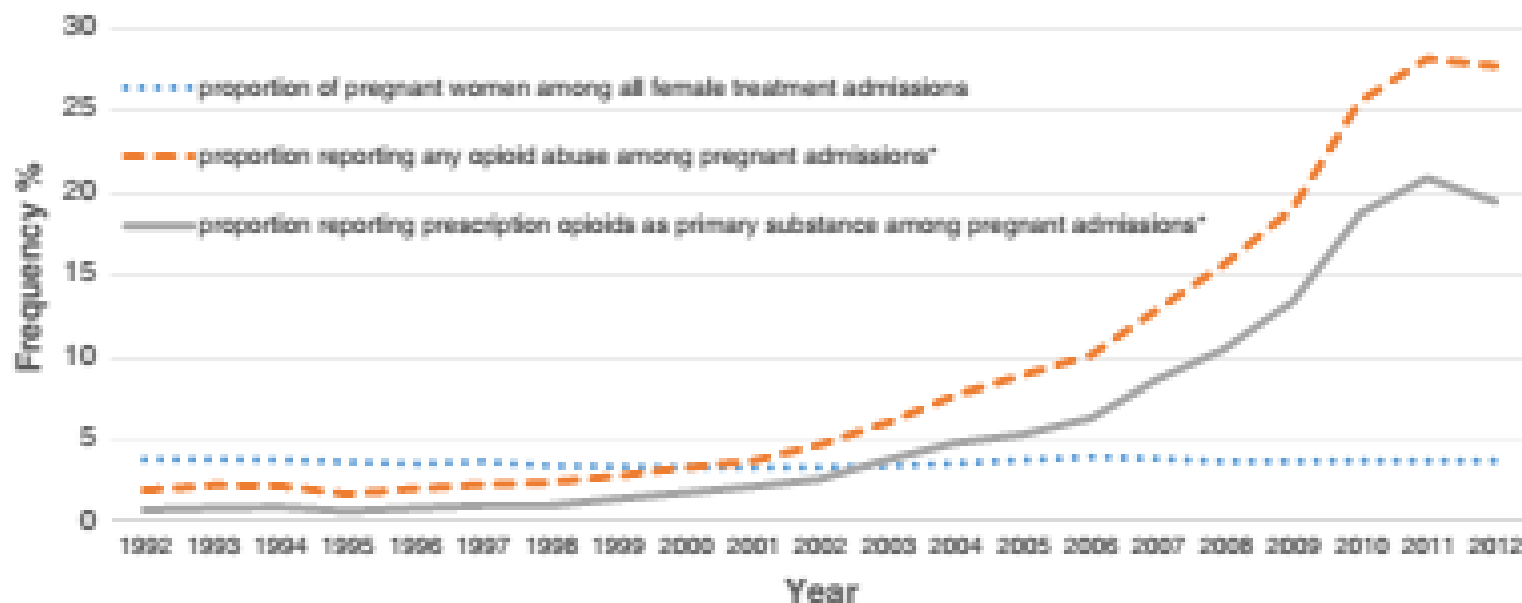


Caitlin E. Martin, M.D., M.P.H.^a, Nyaradzo Longinaker, M.S.^{b,*}, Mishka Terplan, M.D., M.P.H.^c

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Neonatal Abstinence Syndrome and Associated Health Care Expenditures

United States, 2000-2009

JAMA, May 9, 2012—Vol 307, No. 18

Stephen W. Patrick, MD, MPH, MS

Robert E. Schumacher, MD

Brian D. Benneyworth, MD, MS

Elizabeth E. Krans, MD, MS

Jennifer M. McAllister, MD

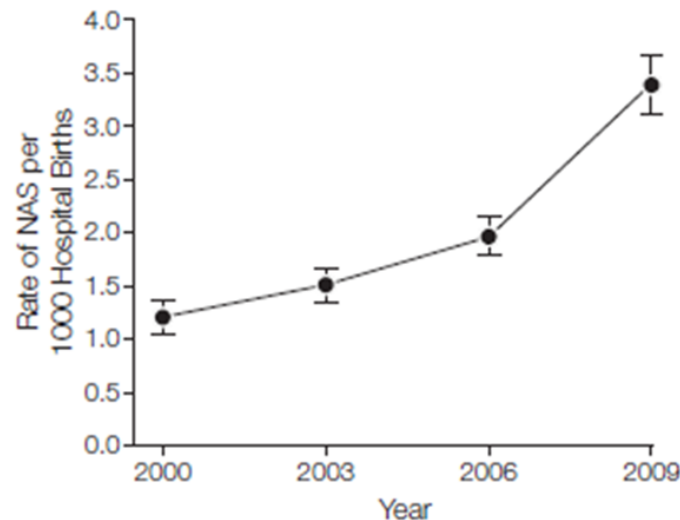
Matthew M. Davis, MD, MAPP

Context Neonatal abstinence syndrome (NAS) is a postnatal drug withdrawal syndrome primarily caused by maternal opiate use. No national estimates are available for the incidence of maternal opiate use at the time of delivery or NAS.

Objectives To determine the national incidence of NAS and antepartum maternal opiate use and to characterize trends in national health care expenditures associated with NAS between 2000 and 2009.

Design, Setting, and Patients A retrospective, serial, cross-sectional analysis of a nationally representative sample of newborns with NAS. The Kids' Inpatient Database (KID).

Figure 1. Weighted National Estimates of the Rates of NAS per 1000 Hospital Births per Year



- 2002-2009:
 - Rate of NAS increased
- Cost of care 2009
 - NAS = \$53,400
 - All other births = \$9500
- Proportion of NAS paid for from Medicaid
 - 2002 = 69%
 - 2009 = 78%



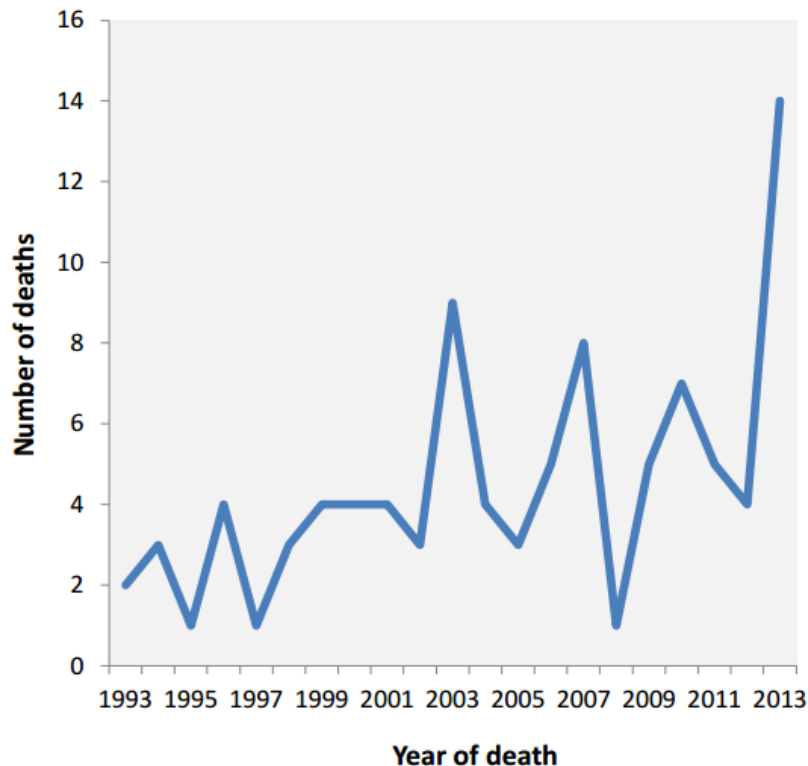
Department of Health
and Mental Hygiene

Martin O'Malley, Governor
Anthony Brown, Lt. Governor
Joshua Sharfstein, MD, Secretary

Increase in Overdose Deaths Among Pregnant Women and New Mothers

October 2014

Unintentional Overdose-Related Pregnancy-
Associated Deaths, 1993-2013.



- 2014 Maryland Maternal Mortality
- 30% Overdose (opioid)
 - 70% had documented comorbid mental health conditions or intimate partner violence
- 20% Homicide/Suicide
- Overall: 50% Maternal Deaths Behavioral Health Related

Original Research

Higher Risk of Homicide Among Pregnant and Postpartum Females Aged 10–29 Years in Illinois, 2002–2011

Abigail R. Koch, MA, Deborah Rosenberg, PhD, and Stacie E. Geller, PhD, for the Illinois Department of Public Health Maternal Mortality Review Committee Working Group

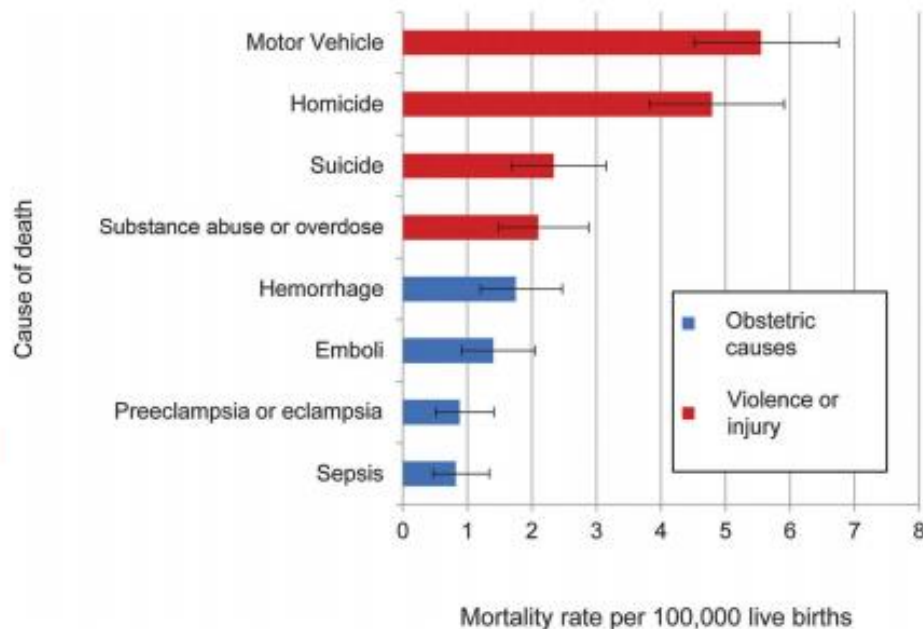


Fig. 1. Ten-year pregnancy-associated mortality rates for deaths by violence and injury compared with the leading obstetric causes in Illinois, 2002–2011.

Koch. Pregnancy-Associated Homicide in Illinois. *Obstet Gynecol* 2016.

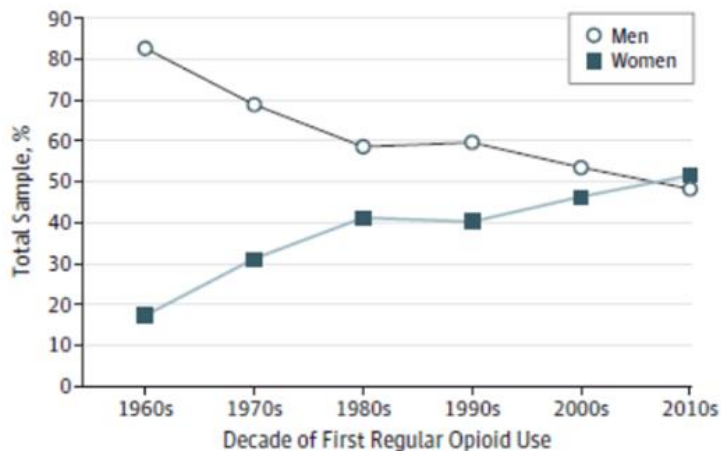
Heroin Increasing, Especially among Women

Original Investigation

The Changing Face of Heroin Use in the United States A Retrospective Analysis of the Past 50 Years

Theodore J. Cicero, PhD; Matthew S. Ellis, MPE; Hilary L. Surratt, PhD; Steven P. Kurtz, PhD

Figure 2. Sex Distribution of Respondents Expressed as Percentage of the Total Sample



Data are plotted as a function of decade in which respondents initiated their opioid abuse.

Heroin Use Has INCREASED Among Most Demographic Groups

	2002-2004*	2011-2013*	% CHANGE
SEX			
Male	2.4	3.6	50%
Female	0.8	1.6	100%
AGE, YEARS			
12-17	1.8	1.6	--
18-25	3.5	7.3	109%
26 or older	1.2	1.9	58%
RACE/ETHNICITY			
Non-Hispanic white	1.4	3	114%
Other	2	1.7	--
ANNUAL HOUSEHOLD INCOME			
Less than \$20,000	3.4	5.5	62%
\$20,000-\$49,999	1.3	2.3	77%
\$50,000 or more	1	1.6	60%
HEALTH INSURANCE COVERAGE			
None	4.2	6.7	60%
Medicaid	4.3	4.7	--
Private or other	0.8	1.3	63%

Pregnancy and Substance Use Today

HOME PAGE TODAY'S PAPER VIDEO MOST POPULAR U.S. Edition ▼

The New York Times **U.S.**

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION

POLITICS EDUCATION TEXAS

Case Explores Rights of Fetus Versus Mother



Darren Hauck for The New York Times

Alicia Beltran, 28, was sent to a drug-treatment center despite insisting she was not using drugs.

By ERIK ECKHOLM

Published: October 23, 2013 | 670 Comments



A parent's heroin addiction, a newborn's death sentence



Mike De Sisti

Nicole Beltrame with her 18-month-old daughter, Nevaeh, with whom she was recently reunited. Beltrame became addicted to painkillers after a bad car accident, but she's off the drugs now and pregnant again, with her baby due this month.

By Crocker Stephenson of the Journal Sentinel

Nov. 14, 2014



 Tweet 24 Recommend 222 +1 2 EMAIL  PRINT (0) COMMENTS

Photo Gallery

No bystander could be more innocent. No damage so helplessly collateral.

Trysten Jacob Powell, delivered by C-section at Wheaton Franciscan-St. Joseph hospital on March 28, 2013, lived three months.

“No bystander could be more innocent. No damage so helplessly collateral.”



Crack Babies: The Worst Threat Is Mom Herself

By Douglas J. Besharov

LAST WEEK in this city, Greater Southeast Community Hospital released a 7-week-old baby to her homeless, drug-addicted mother even though the child was at severe risk of pulmonary arrest. The hospital's explanation: "Because [the mother] demanded that the baby be released."

The hospital provided the mother with an apnea monitor to warn her if the baby stopped breathing while asleep, and trained her in CPR. But on the very first night, the mother went out drinking and left the child at a friend's house—without the monitor. Within seven hours, the baby was dead. Like Dooney Waters, the 6-year-old living in his mother's drug den, whose shocking story was reported in The Washington Post last week, this child was all but abandoned by the authorities.

Stigma

- Pregnant women who use drugs endure a particular “stigma”
- Pregnant women are treated differently by the Criminal Justice system
- Stigma – applies to treatment (esp medication assisted treatment)
- More appropriate terms:
 - Discrimination or Prejudice

Why are pregnant women who use drugs discriminated against?

Combination of

- specific state-level policies coupled with the
- (failed) drug war policies



State Policies on Substance Use during Pregnancy

Policy	Number of States
Substance Use Considered Child Abuse	18
Substance Use Grounds for Civil Commitment	3
Targeted Programs for Pregnant Women	19
Pregnant Women Given Priority Access	12
Pregnant Women Protected from Discrimination	4

Punishing Pregnant Women: Not Best Practice

Maternal-Fetal Unit



The American College of
Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

COMMITTEE OPINION

Number 664 • June 2016

(Replaces Committee Opinion Number 321, November 2005)

Committee on Ethics

This Committee Opinion was developed by the American College of Obstetricians and Gynecologists' Committee on Ethics in collaboration with committee members Mary Faith Marshall, PhD, and Brownsyne M. Tucker Edmonds, MD, MPH, MS. The Committee on Ethics wishes to acknowledge the assistance of Ashley R. Filo, MD, in the development of this document.

While this document reflects the current viewpoint of the College, it is not intended to dictate an exclusive course of action in all cases. This Committee Opinion was approved by the Committee on Ethics and the Executive Board of the American College of Obstetricians and Gynecologists.

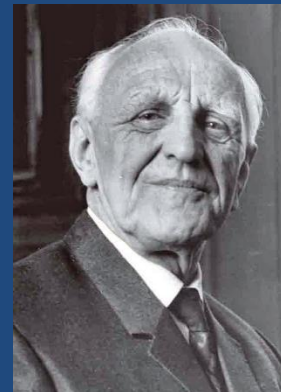
Refusal of Medically Recommended Treatment During Pregnancy

ABSTRACT: One of the most challenging scenarios in obstetric care occurs when a pregnant patient refuses recommended medical treatment that aims to support her well-being, her fetus's well-being, or both. In such circumstances, the obstetrician-gynecologist's ethical obligation to safeguard the pregnant woman's autonomy may conflict with the ethical desire to optimize the health of the fetus. Forced compliance—the alternative to respecting a patient's refusal of treatment—raises profoundly important issues about patient rights, respect for autonomy, violations of bodily integrity, power differentials, and gender equality. The purpose of this document is to provide obstetrician-gynecologists with an ethical approach to addressing a pregnant woman's decision to refuse recommended medical treatment that recognizes the centrality of the pregnant woman's decisional authority and the interconnection between the pregnant woman and the fetus.

Maternal-Infant Dyad

“There is no such thing as a baby ... If you set out to describe a baby, you will find you are describing a baby and someone. A baby can not exist alone, but is essentially part of a relationship”

(D.W. Winnicott 1966)



Punishing Pregnant Women: Not Best Practice

- Discriminatory in how applied
 - Although SUDs affect all, white women more likely to use in pregnancy, black women and poor women far more likely to be prosecuted
- Not grounded in evidence
 - Harms of illicit substances exaggerated; effects of licit substances minimized
- Unintended consequences
 - Policies drive women from PNC, SUD treatment
- Prenatal Care ameliorates adverse effects of substances in women who use drugs

What happens when women who use substances get pregnant?

What happens when women who use substances get pregnant?

Substance use by trimester		Not pregnant	Abstinence during pregnancy	Postpartum
Alcohol				
First	19.0	54.0	92%	45.4
Second	5.0			
Third	4.4			
Cigarettes				
First	19.9	24.0	47%	20.1
Second	13.4			
Third	12.8			
Illicit drugs				
First	9.0	11.4	79%	8.7
Second	4.8			
Third	2.4			

NSDUH 2012/13 Past Month

What happens when women who use substances get pregnant?

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Second	4.8			
Third	2.4			

- Compared to non-pregnant women, women drink less alcohol, smoke fewer cigarettes, and use fewer illicit drugs during pregnancy with exception of pregnant adolescents
- Use decreases through the course of pregnancy by trimester
- The greatest reduction is seen earlier
- 80% resume use postpartum

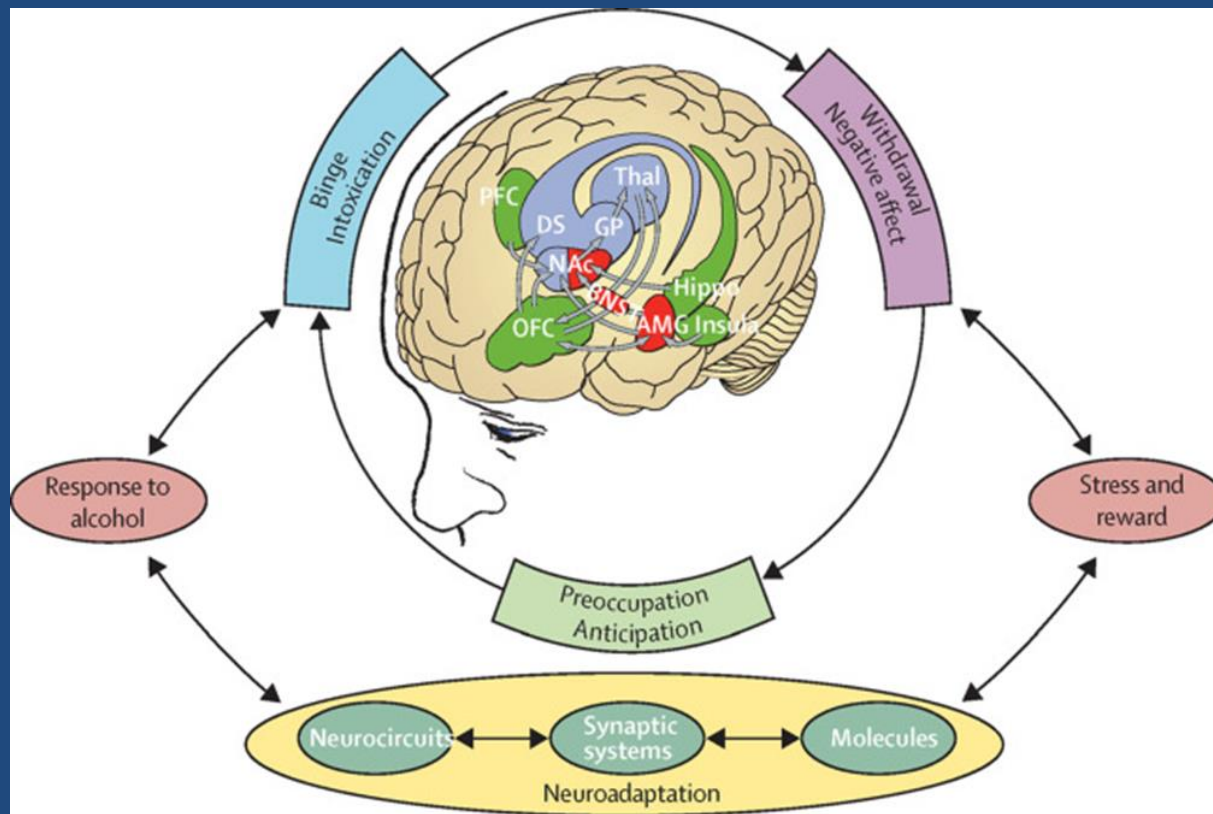
All pregnant women are motivated to maximize their health and that of their baby-to-be

- All women are aware of the risks associated with substance use
- All employ a range of strategies to reduce or change intake
 - Decrease or stop use
 - Switch drugs
 - Enter prenatal care
 - Enter SUD treatment

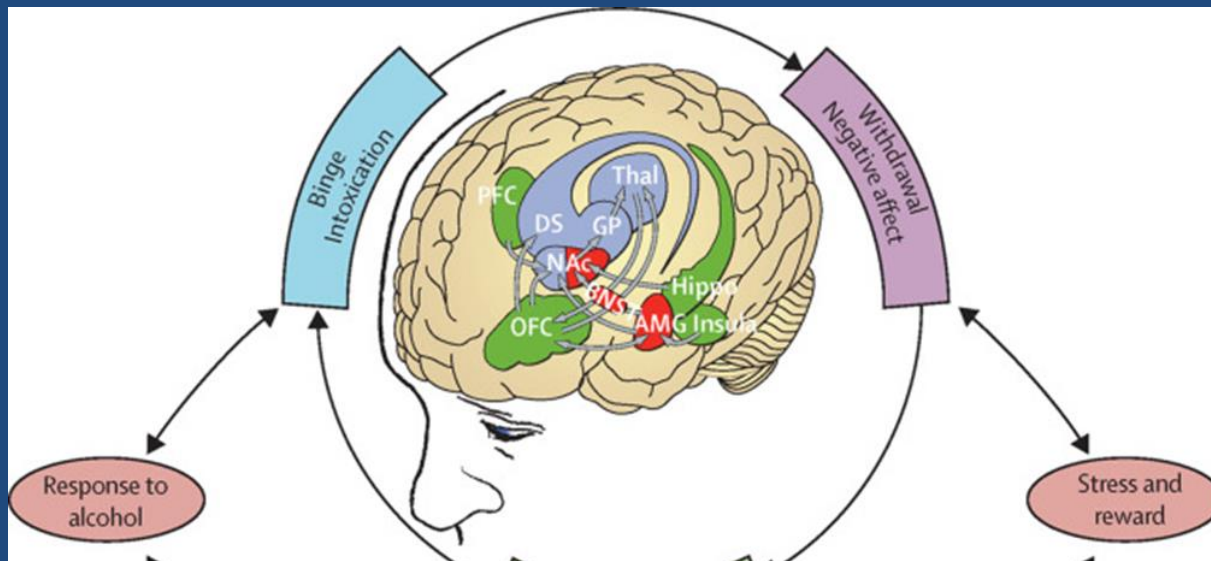
All pregnant women are motivated to maximize their health and that of their baby-to-be

Those who can't quit or cut back –
have a substance use disorder

Continued use in pregnancy is pathognomonic for addiction



- A primary, **chronic** disease of **brain reward, motivation, memory** and **related circuitry**. Dysfunction in these circuits leads to characteristic biological, psychological, social and spiritual manifestations. (ASAM)
- A chronic, relapsing disease characterized by **compulsive** drug seeking and use despite harmful consequences as well as neurochemical and molecular changes in the brain. (NIDA)



Addiction: A brain disease whose visible symptoms are behaviors

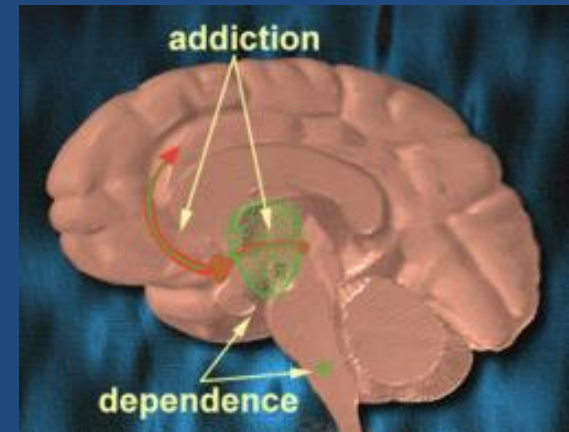
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Addiction as a chronic disease – in context

- We know how to treat addiction
- We know a little less about how to prevent addiction
- We don't know how to cure addiction
- Disease severity may change over time – risk of symptom recurrence is always present
- Goal – lifelong management – support recovery

Addiction vs Dependence/Tolerance

- Physical dependence/tolerance is not addiction
 - Addiction is a brain disease that affects behaviour
 - Dependence is an expected adaptation of the body to a specific substrate so that in the absence of that substrate a withdrawal syndrome develops
 - Tolerance is pharmacologic principle where reaction to specific concentration of drug is reduced with repeated use
 - Affect different parts of the brain
- Many medications cause either tolerance or dependence or both (SSRIs, HTN medication)
 - Everyone taking enough opioid continuously for longer than a week



Women with SUD in Pregnancy

Women with SUD in Pregnancy



Reproductive Health Lifecourse

Women with SUD in Pregnancy

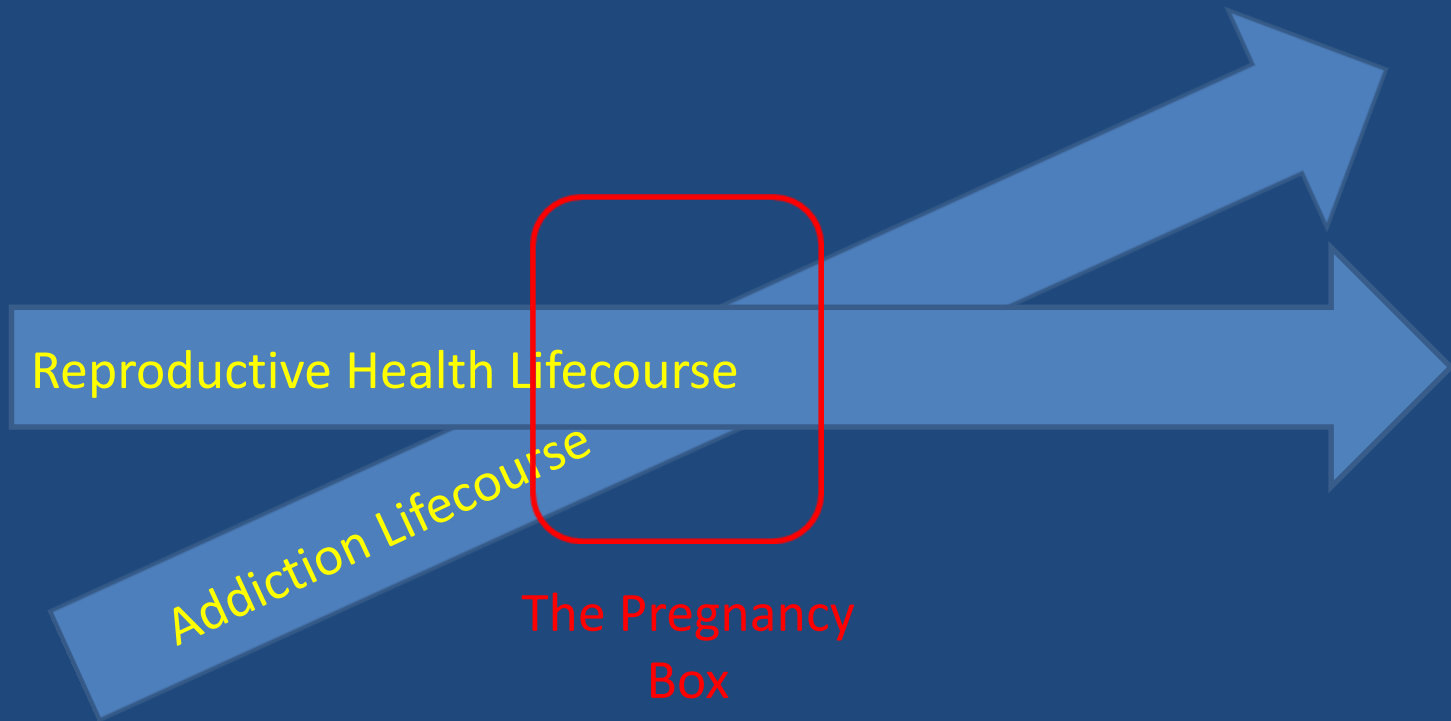


Reproductive Health Lifecourse

The diagram features three blue arrows on a dark blue background. A horizontal arrow points to the right and contains the text 'Reproductive Health Lifecourse'. A diagonal arrow points upwards and to the right, intersecting the horizontal arrow, and contains the text 'Addiction Lifecourse'. A third arrow points upwards and to the right, starting from the intersection of the other two and extending further into the upper right corner.

Addiction Lifecourse

Women with SUD in Pregnancy



Women with SUD in pregnancy

- Mental Health

- Two thirds co-occurring mental health disorders

(Benningfield 2010)

- Past 30 days: Mood disorder (50%), Anxiety (40%), PTSD (16%)

- Childhood trauma: 50-90% physical or sexual abuse

(Cormier 2000)

- 60-80% past year intimate partner violence

(Engstrom 2012, Tuten 2004)

- Chronic pain worse in IPV survivors

(Wuest 2008)

Women with SUD in Pregnancy

- Reproductive Health
 - Unplanned pregnancy: 80% (Heil 2012)
 - Low rates of contraception (Terplan 2015)
 - Higher rates of HIV
- Other substance use
 - High rates of smoking (>90%)
- Nutritional other medical needs
- Social functioning
 - Inadequate social supports
 - 67% their parents used drugs (Finnegan 1991)
 - Unpredictable parenting models
 - Children – childcare needs

Women with SUD in Pregnancy

- Stigma and Shame
- Prior poor experiences with providers
- Fear of CPS

- Pregnant women with SUD have unique set of needs across multiple domains – domains that affect both obstetric health and outcomes and addiction treatment
- Care needs to address those needs
- “Gold Standard” – Integration
 - Comprehensive co-located service delivery
 - Close collaboration between SUD and PNC provider

Comprehensive prenatal care (PNC) ameliorates adverse outcomes associated with drug use

MANAGEMENT OF PREGNANT DRUG-DEPENDENT WOMEN

Loretta P. Finnegan
Department of Pediatrics
Thomas Jefferson University
Philadelphia, Pennsylvania 19107

1978

**LOW
BIRTH
WEIGHT**

PNC

No PNC

**No drug
use**

14%

19%

**Drug
Use**

19%

48%

140

Annals New York Academy of Sciences

TABLE 2

OBSTETRICAL COMPLICATIONS IN 367 DRUG-DEPENDENT WOMEN
AND 215 CONTROLS; FAMILY CENTER PROGRAM, 1969-1976

Groups	No. of Patients	Average no. of Prenatal Visits	Obstetrical Complications %	LBW Incidence %	Pre-eclampsia %
A	65	0	36.9	47.7	9.2
B	109	1.9	32.1	35.5	2.8
C	193	8.2	33.7	19.7	4.7
D	93	0	32.3	19.4	8.6
E	122	9.2	32.0	13.9	8.2

Comprehensive Treatment Works

- Kaiser Early Start – Behavioral Health embedded in PNC
 - Birth outcomes among Early Start moms were same as non-drug-using women (Goler 2008)
 - Cost effective – net cost benefit of \$6 million (50,000 individuals) (Goler 2012)
 - Early Start expanded to all Kaiser NoCal OB clinics

How do we identify women with substance use in pregnancy?

- Early identification is key
 - Allows for early intervention and treatment that minimizes potential harms to the mother and her pregnancy
 - Maximizes motivation for change during pregnancy
- 2 types of screening
 - Pregnant women in prenatal care for substance use
 - Reproductive-aged women in SUD treatment for pregnancy – pregnancy intention

Screening Pregnant Women for Substance Use

- Universal screening (for licit and illicit substance use) is recommended
 - Alcohol (ACOG 2011)
 - Prescription opioids (ACOG 2012)
- Selective screening based on “risk factors” perpetuates discrimination and misses most women with problematic use

Screening: Instruments

- No single best screening instrument to identify pregnant women with substance problems
- Self-administered or part of the patient interview
- Developed for or validated in pregnant women (partial list)
 - Alcohol: T-ACE (Sokol 1989); TWEAK (Chang 1999)
 - Alcohol and other drugs: DAST and MAST (Kemper 1993); 4P's Plus (Chasnoff 1999); CRAFFT (Chang 2011) for pregnant adolescents

Screening: Urine toxicology?

- Do not use as sole assessment of substance use/use disorder (ACOG 2012)
 - Short detection window (substance dependent)
 - Might not capture binge or intermittent use
 - Rarely detects alcohol
 - Doesn't capture prescription opioids (without confirmation testing)
- Useful adjunct primarily for individuals in treatment
- Ethical issues – patient needs to give consent prior to specimen collection

Treatment

Treatment for Opioid Use Disorder in Pregnancy

- Standard of care: Medication Assisted Treatment
 - Methadone or Buprenorphine
- Benefits
 - Stable intrauterine environment (no cyclic withdrawal)
 - Increased maternal weight gain
 - Increased newborn birth weight and gestational age
 - Increase PNC adherence
 - Decrease in illicit drug use - reduction of HIV/HCV acquisition
 - Decrease risk of overdose
 - Other supportive services

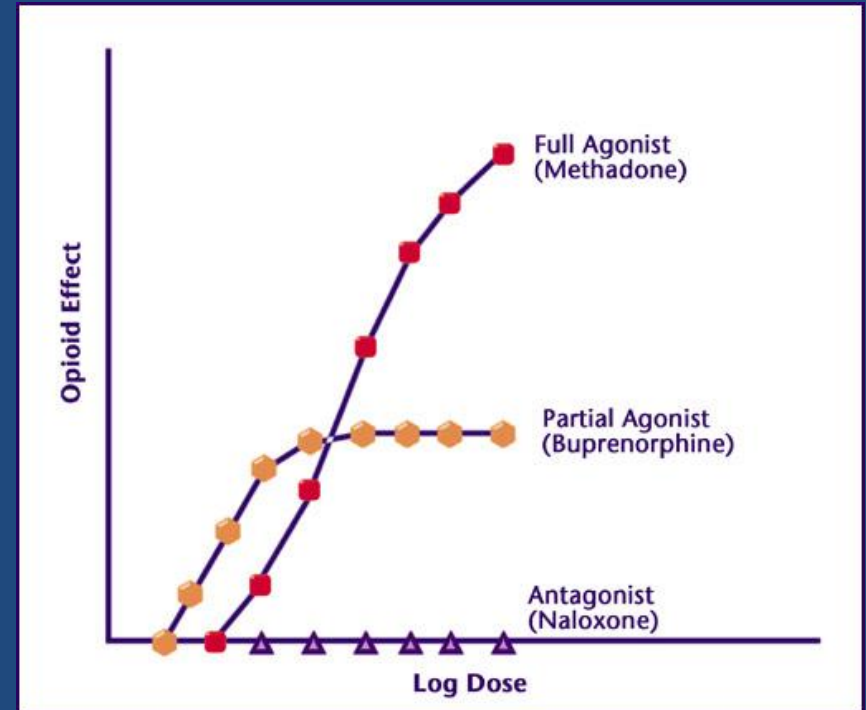
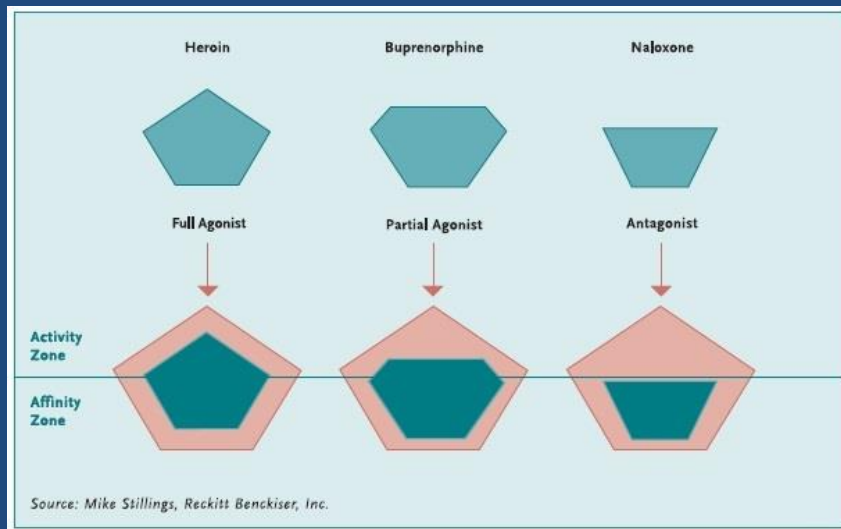
Treatment of Opioid Use Disorder in Pregnancy

- “Because it is crucial that pregnant women engage in treatment for their addictions, OTPs should **give priority to admitting pregnant patients at any point during pregnancy** and providing them with all necessary care, including adequate dosing strategies as well as referrals for prenatal and follow-up postpartum services.”
Federal Guidelines for Opioid Treatment Programs, 2015
- Pregnant women – don’t need to meet DSM criteria for use disorder to receive MAT (TIP 43)

Treatment of Opioid Use Disorder in Pregnancy

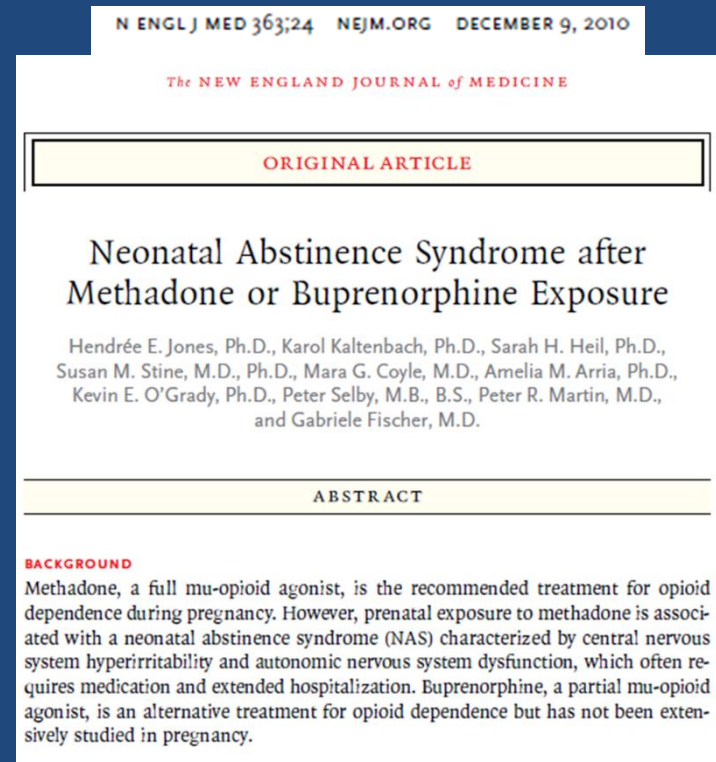
- Medication Assisted Treatment (MAT)
 - Methadone
 - Buprenorphine
 - Naltrexone
- Behavioral Therapy
- MAT is supported by
 - ASAM
 - ACOG
 - SAMHSA
 - CDC
 - WHO

Opioid receptor activation

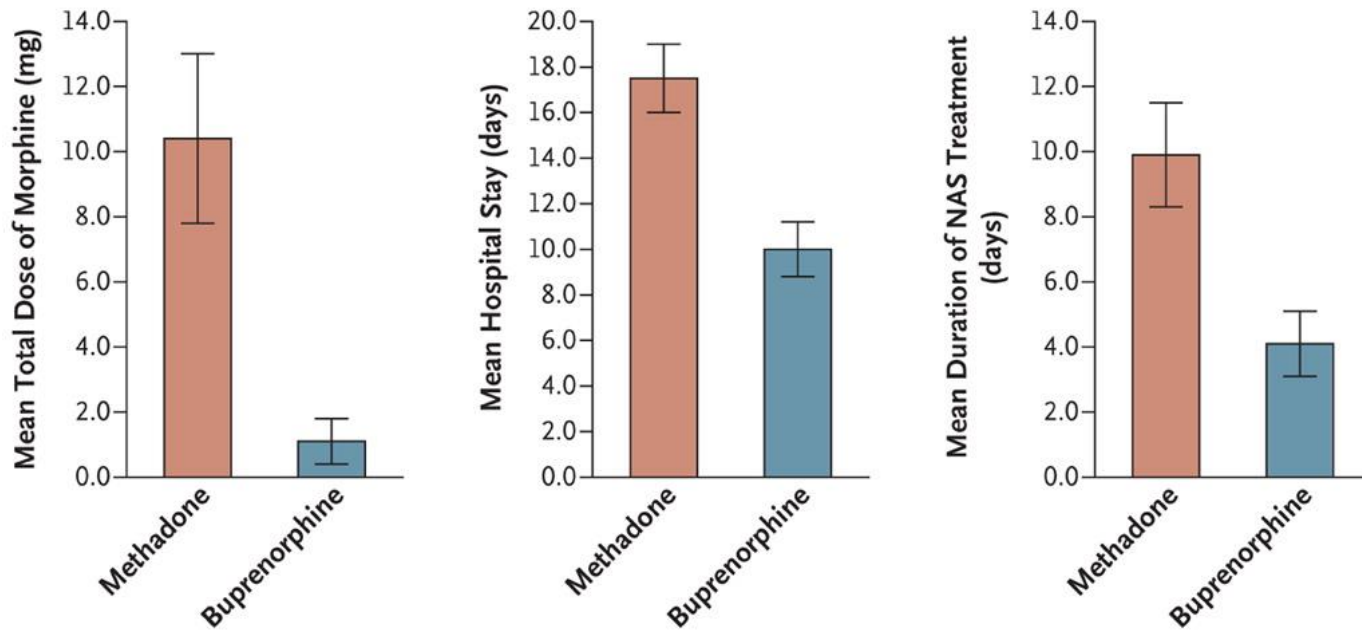


Which Medication?

- Methadone standard of care since 1970s
- Buprenorphine studied since 2002
- What about naltrexone?



Mean Neonatal Morphine Dose, Length of Neonatal Hospital Stay, and Duration of Treatment for Neonatal Abstinence Syndrome.



The NEW ENGLAND
JOURNAL of MEDICINE

MOTHER Study: Secondary Outcomes

- Maternal outcomes similar in the 2 study conditions (N=131)
 - Low rates of illicit drug use during pregnancy and at delivery
- Clinically meaningful attrition rate in buprenorphine condition (18% in methadone arm vs 33% in buprenorphine arm)

Methadone vs Buprenorphine in Pregnancy

Methadone

- May have better treatment retention
- No risk precipitating withdrawal
- Patients with more severe opioid use disorder

Buprenorphine

- Probably less severe NAS
- Reduced risk of overdose during induction
- Reduced risk of overdose if children exposed to medication

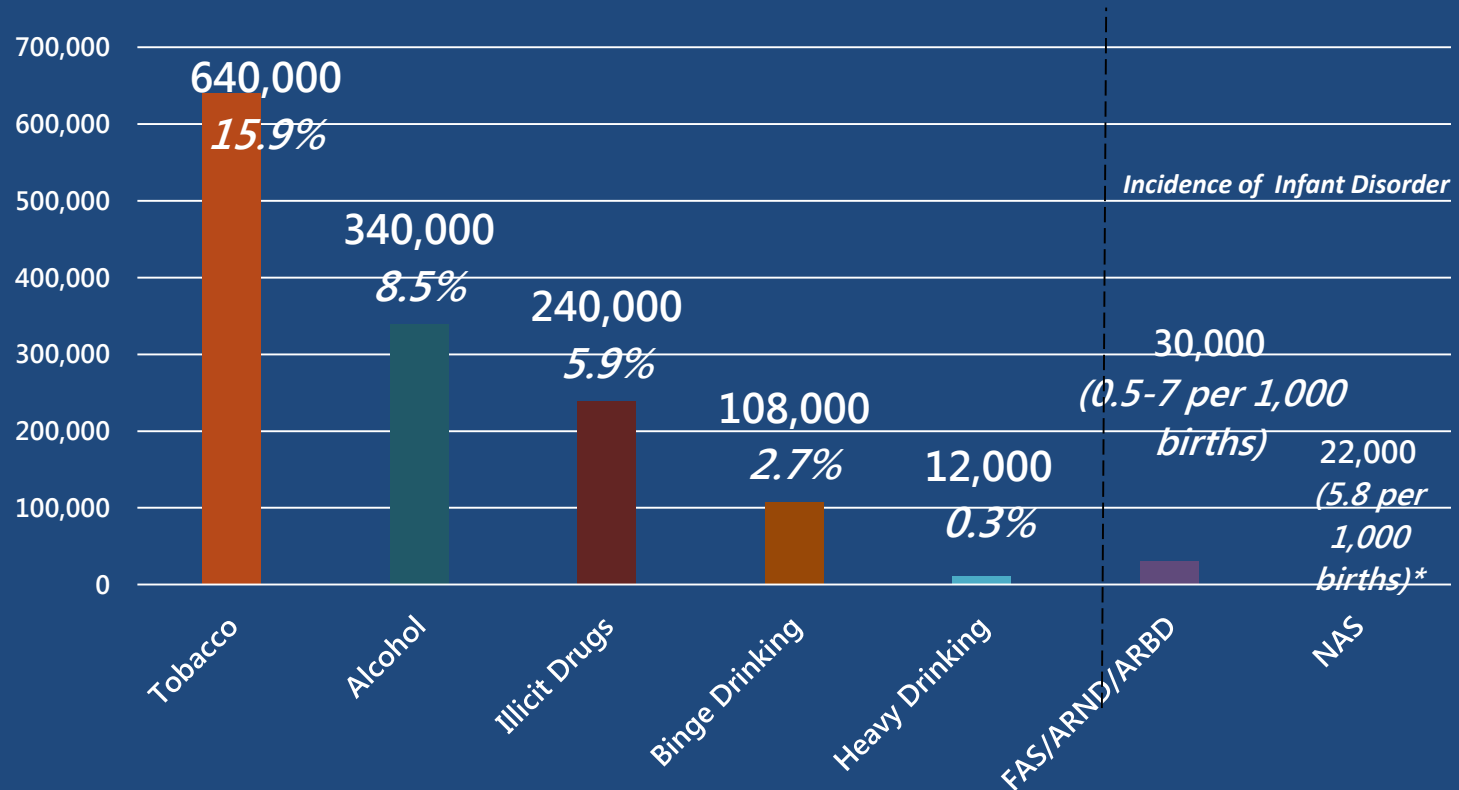
Treatment of Opioid Use Disorder in Pregnancy

- How to dose pregnant women?
 - Dose increase earlier to avoid fetal withdrawal
 - Overlap in symptoms between normal pregnancy and withdrawal
- Third trimester
 - Physiological changes (metabolism, circulating volume) may need increase dose
 - Consider split dosing
 - Individualized treatment – do not automatically increase
- Post partum
 - 4-6 weeks for return to pre-pregnancy state
 - Individualize decrease

Medically Supervised Withdrawal

- Addiction is chronic disease – detox is an acute treatment: Clinical mismatch
- Leads to relapse
- Not supported by guidelines (ACOG, ASAM, Federal Guidelines for Opioid Treatment 2015)
- Maternal dose reduction to prevent NAS – does not work (Berghella 2003)

Estimated Number of Infants* Affected by Prenatal Exposure, by Type of Substance and Infant Disorder



*Approximately 4 million (3,952,841) live births in 2012

Estimates based on: National Survey on Drug Use and Health, 2012; Martin, Hamilton, Osterman, Curtin & Mathews. Births: Final Data for 2012. National Vital Statistics Report, Volume 62, Number 9;

*Patrick, et al., (2015). Increasing incidence and geographic distribution of neonatal abstinence syndrome: United States 2009 to 2012. Journal of Perinatology 35, 650-655

JAMA.2012.3951; May, P.A., and Gossage, J.P.(2001). Estimating the prevalence of fetal alcohol syndrome: A summary. Alcohol Research & Health 25(3):159-167. Retrieved October 21, 2012 from <http://pubs.niaaa.nih.gov/publications/arrh25-3/159-167.htm>

Fetal Alcohol Spectrum Disorders

- Terminology
 - Fetal Alcohol Syndrome (FAS): facial dysmorphism, growth and CNS problems
 - Alcohol-Related Neurodevelopment Disorder (ARND):
Leading cause of preventable intellectual disability in US
 - Alcohol-Related Birth Defects (ARBD): heart, kidney, bones, hearing, or combination
- Prevalence
 - FAS: 0.2-1.5 per 1000 births
 - FASD: limited data 2-5/100 school children
- Cost
 - FAS: \$2 million/child, \$4 billion annually in US

Neonatal Abstinence Syndrome

- Expected and treatable consequence of opioid exposure in utero
 - (ACOG 2012) (GAO 2015)
 - Illicit opioids, prescription opioids including MAT
- Without long term negative outcomes

NAS is NOT Addiction

- Newborns can't be “born addicted”
 - NAS is withdrawal – due to dependence – dependence NOT addiction
 - Addiction is brain disease whose visible symptoms are behaviors – newborn can't have the behaviors associated with addiction (compulsion, etc)
 - Addiction is chronic disease – chronic illness can't be present at birth

Neonatal Abstinence Syndrome

PEDIATRICS Volume 134, Number 2, August 2014

TABLE 1 Onset, Duration, and Frequency of NAS Caused by Various Substances

Drug	Onset, h	Frequency, %	Duration, d
Opioids			
Heroin	24–48	40–80 ²⁷	8–10
Methadone	48–72	13–94 ³⁷	Up to 30 or more
Buprenorphine	36–60	22–67 ^{46,48}	Up to 28 or more
Prescription opioid medications	36–72	5–20 ^{56,60}	10–30
Nonopioids			
SSRIs	24–48	20–30 ⁶⁴	2–6
TCAs	24–48	20–50 ⁶⁴	2–6
Methamphetamines	24	2–49 ¹⁰¹	7–10
Inhalants	24–48	48 ⁷⁰	2–7

NAS: Other Factors Contributing to Severity

- Structural
 - The NAS assessment
 - Medication initiation
 - Weaning protocols
 - NICU or rooming-in
- Postpartum
 - Breastfeeding
 - Skin-to-skin contact
- Non-modifiable - genetics
 - OPRM1 – opioid receptor (Wachman 2014)
 - CYP – placental transfer
- Other Substances
 - Benzodiazepines
 - SSRIs
 - Cigarette smoking

Neonatal Abstinence Syndrome and Associated Health Care Expenditures United States, 2000-2009

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Context Neonatal abstinence syndrome (NAS) is a postnatal drug withdrawal syndrome primarily caused by maternal opiate use. No national estimates are available for the incidence of maternal opiate use at the time of delivery or NAS.

Objectives To determine the national incidence of NAS and antepartum maternal opiate use and to characterize trends in national health care expenditures associated with NAS between 2000 and 2009.

Design, Setting, and Patients A retrospective, serial, cross-sectional analysis of a nationally representative sample of newborns with NAS. The Kids' Inpatient Database (KID)

Figure 1. Weighted National Estimates of the Rates of NAS per 1000 Hospital Births per Year

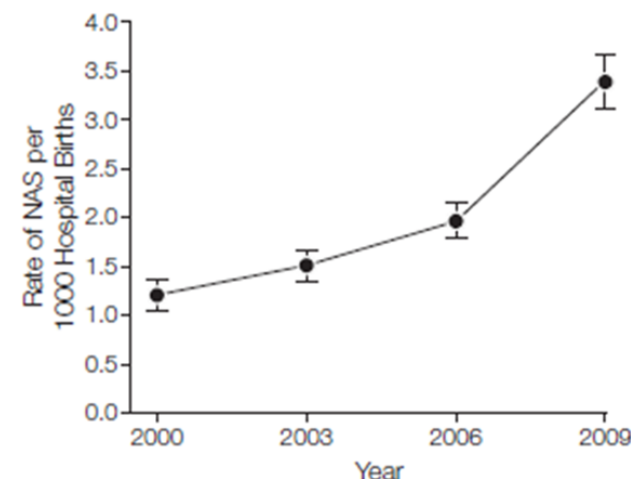


Table 3. Mean Hospital Charges and Length of Stay for Neonatal Abstinence Syndrome vs All Other US Births

	Mean (95% CI)				P for Trend
	2000	2003	2006	2009	
Neonatal Abstinence Syndrome					
Unweighted sample, No.	2920	3761	5200	9674	
Length of stay, d	15.8 (14.2-17.3)	15.9 (14.5-17.3)	15.3 (14.6-16.0)	16.4 (15.8-17.1)	.06
Hospital charges, 2009 US \$	39 400 (33 400-45 400)	47 900 (40 800-55 100)	44 600 (40 400-48 900)	53 400 (49 000-57 700)	<.001
All Other US Births					
Unweighted sample, No.	784 191	890 582	1 000 203	1 113 122	
Length of stay, d	3.1 (3.0-3.1)	3.2 (3.1-3.2)	3.2 (3.2-3.3)	3.3 (3.3-3.4)	<.001
Hospital charges, 2009 US \$	6600 (5800-7300)	7300 (6900-7600)	8200 (7800-8600)	9500 (9000-9900)	<.001

Table 4. Proportions of US Hospital Charges for Neonatal Abstinence Syndrome by Payer^a

Year	Unweighted Sample, No.	Weighted % (95% CI)			
		Medicaid	Private Payer	Self-pay	Other Payer
2000	2920	68.7 (63.3-76.7)	18.2 (14.6-22.5)	8.7 (5.6-13.3)	4.4 (2.0-9.3)
2003	3761	69.9 (65.9-73.6)	19.8 (16.9-23.1)	6.5 (4.5-9.3)	3.8 (1.6-8.7)
2006	5200	73.7 (70.4-76.7)	19.0 (16.4-22.0)	5.5 (4.4-6.9)	1.9 (1.3-2.8)
2009	9674	77.6 (74.4-80.4)	17.6 (15.1-20.4)	2.9 (2.4-3.4)	2.0 (1.4-2.9)

^aPercentages may not sum to 100 because of rounding.

Cost of care = Severity of Disease?

- Cost reflects how and where we care for infants (NICU) – not where they have to be cared for
- Rooming-in infants (Abrahams Can Fam Physician 2007)
 - Less likely to be treated for NAS (RR=0.47 [0.24-0.93])
 - Fewer days treated (5.9 vs 18.6 p=0.003)
 - Days in hospital (11.8 vs 25.9, p<0.001)
 - Discharged with mother (RR=1.52 [1.01-2.29])

The 4th Trimester - Postpartum

- Critical Period
 - Newborn care, breastfeeding, maternal/infant bonding
 - Mood changes, sleep disturbances, physiologic changes
 - Cultural norms, “the ideal mother” in conflict with what it is actually like to have a newborn
- Neglected Period
 - Care shifts away from frequent contact with PNC provider – to pediatrician
 - Care less “medical” (for mom) and shifts to other agencies (WIC)
 - Insurance and welfare realignment
 - SUD treatment provider(s) – care is constant
- Gaps in care – addressed through public health interventions – home visiting etc

Putting it all together

- All pregnant women manifest motivation to maximize their health during pregnancy
- Most women stop or decrease use in pregnancy
- Those that can't have a SUD
- Engagement in care improves outcomes
- However pregnant women with SUDs have unique set of needs and experience discrimination
- Therefore care needs to be compassionate and non-judgmental, comprehensive and coordinated with PNC provider
- Preventing substance exposed pregnancies means decreasing unplanned pregnancies, increasing access to reproductive health services, specifically contraception

Thank You

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Breastfeeding and substance use

- Breastfeeding encouraged if:
 - Engaged in treatment (including MAT – regardless of dose) and plan to continue in treatment
- Breastfeeding contraindicated:
 - Active use, not engaged in treatment, no prenatal care
- Cannabis – controversial – AAP recommends not breastfeeding
- Alcohol (wait 90-120 minutes after drinking before breastfeeding – or pump and discard)
- Breastfeeding conversation – opportunity to support smoking cessation